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**UNITED STATES PATENT APPLICATION**

*of*

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*for*

**A METHOD FOR SELECTING ONE OF  
SEVERAL RECEIVERS IN A DIVERSITY RECEIVER SYSTEM**

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5 *Background of the Invention*

The invention relates to a method for selecting one of several receivers in a diversity receiving system as well as a circuit arrangement for implementing the method.

10 Diversity receiving systems with several receivers are used, for example, in vehicles. The receivers can be *for example* ~~e.g.~~ audio and video receivers.

Reception and reproduction of video pictures in stationary receiving stations poses no difficulties, because the reception conditions remain largely constant. On the other hand, the reception conditions for a mobile receiving station can vary considerably, depending on the nature of the terrain. For instance, if the mobile receiving station is situated in mountainous terrain, echoes can cause considerable interference with *reception. In* ~~reception, in~~ the radio shadow of mountains or hills, the radio connection can even break down completely, so that, in place of a video picture, only noise is visible on the screen.

In the meantime, motor vehicles such as *for example cars* ~~e.g. passenger cars and~~ *and* ~~also~~ *but* railroad cars, are being equipped with television receivers and screens, so that, ~~on the one~~ *hand,* messages can be displayed, for example traffic reports sent by video text, or, ~~on the other~~ *hand,* the travelers can be entertained with television programs. The receiving conditions in a moving receiving station vary considerably in some circumstances, due to the terrain through which the receiving station is currently passing. Consequently, this will subject the travelers who are watching television to unpleasant and considerable eye strain, because the picture quality can

vary to a great extent. For example, if the vehicle is passing through a radio shadow, the viewers will see only noise on the screen. Looking at a television program with such interference subjects the viewers to fatigue rather than ~~to~~ entertainment.

It is known that the reception of radio signals in mobile receiving stations can be improved by multi-path reception, <sup>also referred to as "diversity"</sup> ~~called "diversity" in English~~. By antenna diversity is understood a receiver which can be connected to one of several antennas, generally spatially separated from one another, while by frequency diversity is understood a system consisting of several receivers which receive the same signals or the same programs on different frequencies. The signals delivered by the antennas in the case of antenna diversity and by the receivers in the case of frequency diversity are tested for their quality, so as to forward and process the best quality signal.

### *Summary of the Invention*

It is therefore the object of the invention to specify, for a diversity receiving system with several receivers, a method for selecting the receiver with the best reception.

The invention achieves this object by comparing the levels of the control signals of the automatic gain control of the receivers, and selecting that receiver whose control signal has the lowest level.

The invention starts from the idea that the level of the control signal of the automatic gain control of a <sup>receiver (e.g. a television receiver)</sup> ~~receiver, e.g. a television receiver~~, is a measure of the reception level. If the level of the control signal reaches its maximum, the reception level is too low; on the other hand, if the level of the control signal reaches its minimum, the reception level lies in the optimum range.

### *Brief Description of the Drawing*

Figure 1 shows a first embodiment of the invention,

Figure 2 shows a second embodiment of the invention.

*Detailed description of the drawing*

The invention will now be described and explained by means of its first embodiment, shown in Figure 1.

Two receivers E1 and E2, <sup>(e.g. television receivers)</sup> ~~e.g. television receivers~~, receive the same program, with an antenna A1 and A2 respectively. The two control signals AGC1 and AGC2 of the two receivers E1 and E2 are compared in a comparator VL. <sup>Via</sup> ~~By means of~~ the controllable changeover switch U, the comparator VL selects the output of that receiver whose control signal has the lower level.

Consequently, the output signal S of the receiver whose control signal has the lower level is always forwarded for further processing. More than two receivers can also exist here.

The second embodiment of the invention, shown in Figure 2, will now be described and explained.

The second embodiment differs from the first one in that the output of the comparator VL is not connected to the control input of the controllable changeover switch U, but to the first control input of a block synchronizer BS. The output signal S of one of the two receivers E1 or E2 is conducted to the second control input of the block synchronizer BS. The control output of the block synchronizer BS is connected to the control input of the controllable changeover switch U.

The second embodiment of the invention is suited for the block transmission of signals.

The block synchronizer BS receives from the comparator VL a control signal for switching over to one receiver if the level of the control signal of the other receiver becomes greater than the level of the control signal of the first receiver. However, the block synchronizer BS does not switch

over to another receiver immediately, but only at the end or beginning of a block. In other words, this means that the block synchronizer BS executes switchover processes with block synchronization. No switchovers are executed within a block.

The second embodiment is especially well suited for a diversity receiving system with television receivers. The switchover process from one receiver to another takes place with line or picture synchronization.

With a third advantageous embodiment of the invention, switchover to another receiver occurs only if the lowest level differs from the levels of the other control signals by a specific minimum value. This measure of providing a hysteresis prevents unnecessary switchover processes.

A special advantage of the invention is that the control signal is present in any case, and the invention can be implemented with only small expense - only a comparator and a controllable changeover switch are needed.

The invention is not limited to television receivers. It is suited for receivers of all kinds for diversity receiving systems. The invention is especially suited for mobile diversity receiving systems, such as are installed <sup>for example</sup> ~~e.g.~~ in vehicles. This can apply to audio and/or video receiving systems. A future application for digital audio transmission is also conceivable.

Add 7B!